2023 INTEGRATED RESOURCE PLAN

Riverside Public Utilities

Mobility & Infrastructure Committee
May 9, 2024

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WHAT IS AN INTEGRATED RESOURCE PLAN (IRP)?

An IRP is used to help guide our future decision-making process as RPU plans to meet its forecasted annual peak and energy demand while systematically reducing its GHG emissions, using a combination of current and new supply-side and demand-side resources.

A well-developed IRP will:

1. Analyze and evaluate both supply-side and demand-side resources
2. Identify one or more "least-cost, least-risk" solution(s) for meeting future load serving needs
3. Address all CA SB 350 requirements and CEC specified topics
4. Propose environmentally sound / financially sustainable procurement strategies

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SB 350 IRP MANDATE

1. Senate Bill 350 requires that POUs develop IRPs to achieve their share of the electric sector's GHG emissions reduction target. IRPs must be updated, approved, and adopted on at least a 5-year cycle.
2. IRPs must address multiple topics specified in the CEC's POU IRP Submission and Review Guidelines
   a) Demand (Load) Forecasts
   b) Energy Efficiency & Demand Side Management Programs
   c) Future Resource Procurement Plans (including future Capacity requirements)
   d) Current & Future Greenhouse Gas Emissions
   e) Distributed Energy Resources (including DER Impacts on the Distribution System)
   f) Transportation Electrification
   g) Retail Rates
   h) Localized Air Pollutants and Disadvantaged Communities

2023 RPU IRP: PRIMARY GOALS

1. Identify and assess a cost-effective means for RPU to meet the 60% RPS target by 2030 and successfully achieve a zero-carbon portfolio by 2040. (Note: RPU is already on track to exceed its 60% by 2030 RPS target three years ahead of schedule.)
2. Identify and assess a cost-effective means for RPU to reduce its GHG emissions, such that the utility can meet or exceed its specified share of the electric sector's 2030 GHG emission target. (Note: RPU is already on track to get below its 2030 GHG emission target on a Retail Sales basis.)
3. Address and adequately satisfy all other CEC-required topics as specified in the CEC's IRP Submission and Review Guidelines.

IRP: DOCUMENT OVERVIEW & STRUCTURE

1. **19 Chapters, 3 Appendices, ~ 330 pages.**
2. **Responsive to all CEC requirements.**
3. **Produced internally by Power Resources staff.**
4. **Incorporates added analyses & discussions pertinent to RPU's long-range planning efforts.**

2023 IRP: ORGANIZATION

1. Background material & utility overview (Ch 2-4)
   a) 2024-2045 energy & peak demand forecasts
   b) Current generation and transmission resources, & electric distribution system
2. Discuss critical legislative/regulatory mandates & CAISO stakeholder initiatives (Ch 5)
   a) CA Legislation & CARB/CEC/CPUC Regulatory Mandates
   b) CAISO initiatives
3. Summarize and assess current EE/DSM programs (Ch 6 and Ch 14)
4. Quantify 5-7 year intermediate-term power resource forecasts (Ch 8 and 9)
   a) Primary resource portfolio metrics
   b) Renewable energy forecasts and RPS mandates
   c) GHG emission forecasts and mandates
   d) Power resource budget forecasts

2023 IRP: ORGANIZATION (CONT.)

5. Quantify 20+ year long-term forecast (scenarios & impacts: Ch 7 and Ch 10-12)
   a) Projected load growth impacts and forward market prices
   b) Projected load-normalized portfolio cost (PC_{LN}) impacts for future, low-carbon scenarios
   c) Critical long-term budget impacts for the preferred scenarios
   d) Potential BESS replacement options for internal generation units
6. Assess DER impacts on RPU's Distribution System (Ch 13)
   a) Individual analyses of 102 RPU circuits (feeders)
   b) Simulated additions of EV loads and building electrification; simulated impacts of additional PV generation
   c) Maximum DER loading established for each circuit, used to develop preliminary temporal and spatial DER impact assessments

2023 IRP: ORGANIZATION (CONT.)

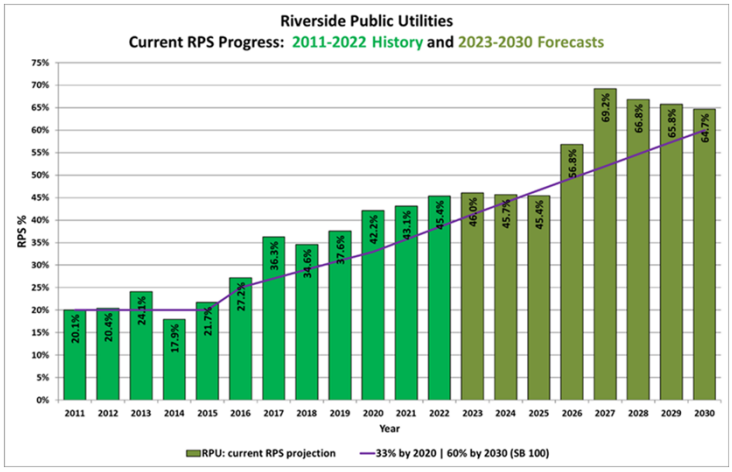
7. Examine & address additional CEC topics (Ch 15-17) and Potential Future Studies (Ch 18)
   a) RPU Rates
   b) Transportation Electrification
   c) Localized Air Pollution Impacts on Disadvantaged Communities
   d) Potential Future Studies

KEY FINDINGS: NEAR-TERM FORWARD FORECASTS

1. RPU is already on track to materially exceed its 60% by 2030 RPS target three years ahead of schedule (based on our current portfolio of assets).
2. RPU is already on track to get below its 2030 GHG emission target on a Retail Sales basis.
3. ~75% of load is naturally hedged via long-term contracts through 2027.
4. Sufficient carbon allowances to cover all expected GHG emissions through 2030.
5. Post-COVID supply-chain issues and significantly increased costs for natural gas are driving up RPU's power supply costs.

Most significant intermediate term risk(s): Costs for short-term (year-ahead) Resource Adequacy (RA) in the CAISO market have increased ~ 200% over the last three years. RPU needs to acquire 2-3 longer-term RA contracts to mitigate this RA cost pressure on our power supply budget.

RPS PROGRESS



1. **RPU can meet current RPS requirements through 2030 with its current portfolio of renewable resources.**
2. **Beyond 2030, RPU will need to procure new renewable and/or carbon-free resources to achieve 100% renewable and carbon neutrality milestone dates:**
   a. 2040 - Envision Riverside 2025 Strategic Plan
   b. 2045 - SB 100

GHG EMISSION TARGETS

1. **There are two types of GHG emissions discussed in this 2023 IRP:**
   a. 1st Importer Emissions (RPU is directly responsible for these & must surrender CARB GHG auction instruments to abate)
   b. Total Portfolio Emissions (estimated emissions for total Retail Sales, shown on Power Content Label)

2. **Reducing RPU's GHG emissions to achieve emission targets is a primary focus of this 2023 IRP**
   a. Two RPU GHG planning targets have been specified by CARB for RPU:

GHG Planning Target	Description	MT CO2-e Emission Value
38 MMT Sector Goal	Official RPU target	349,000
30 MMT Sector Goal	More aggressive GHG reduction scenario	275,000

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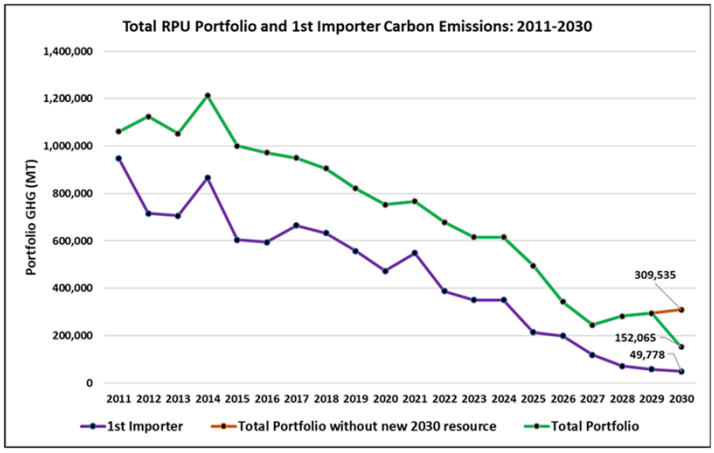
GHG PROGRESS



1. **RPU should get below its official GHG target of 349,000 MT with its current resource portfolio (on a Retail Sales basis).**

2. **RPU can get below the more aggressive GHG target of 275,000 MT by adding one additional renewable resource by 2030 (as contemplated in our 2023 IRP).**

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CARBON-FREE ENERGY PROCUREMENT STRATEGY

New Renewable/Carbon-free Resources	COD	Annual MWh
1a. 50 MW Baseload Geothermal Resource (84% CF)	2030	367,920
1b. 120 MW Solar PV (35% CF) + 50 MW / 200 MWh BESS	2030	367,920
2. Baseload Resource Tranche (90% CF)		
• 50 MW	2034	394,200
• 60 MW	2038	473,040
• 20 MW	2043	157,680
3. 75 MW Solar PV (35% CF)	2037	229,950
4. 75 MW Solar PV (35% CF)	2041	229,950

a. Proposed new renewable/carbon-free resource contracts for 2030-2045.

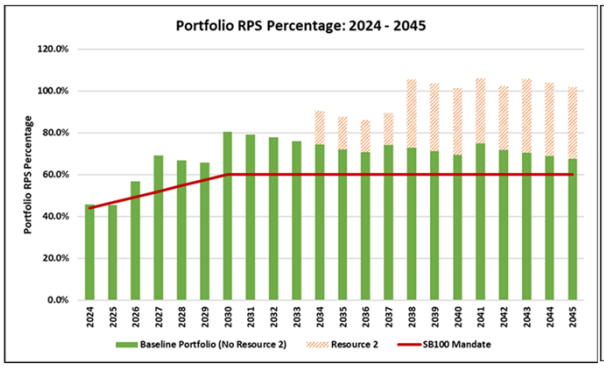
b. Resource 1a & 1b were analyzed/compared to determine which would be the most cost effective for RPU's portfolio.

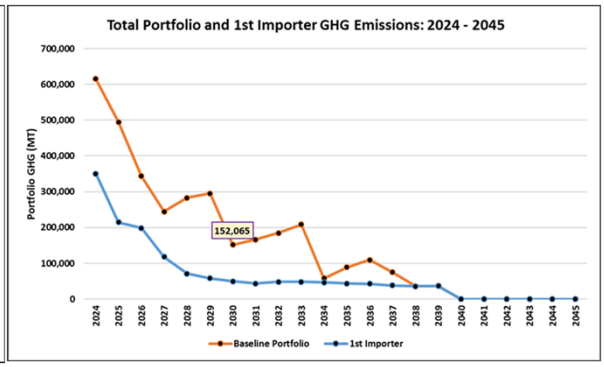
SPRINGS & RERC REPLACEMENT STRATEGY

New Resource	Resource Description	COD
Springs 4-hr BESS I	18 MW / 72 MWh BESS	2028
Springs 4-hr BESS II	18 MW / 72 MWh BESS	2030
RERC 4-hr BESS	100 MW / 400 MWh BESS	2035 or 2040
RERC 6-hr BESS	100 MW / 600 MWh BESS	2035 or 2040

- Additionally, another replacement option studied for RERC has it switching to run on biogas starting January 1, 2035, through its assumed retirement on December 31, 2039.

FORECASTED FUTURE RPS & GHG LEVELS





1. **Under either Baseline (1a or 1b) Portfolio, RPU exceeds a 60% RPS through 2045 even if the Baseload Tranche (Resource 2) is carbon-free but not renewable.**
2. **Under either Baseline (1a or 1b) Portfolio, RPU achieves a carbon free portfolio by 2040 and maintains it through 2045.**

KEY FINDINGS: LONG-TERM RESULTS

1. Geothermal vs Solar PV + Battery Energy Storage (BES): preference will depend on PPA price points – and possibly also BES MW capacity level.
2. Under mid-point pricing assumptions for all new resources, power supply costs increase by ~2% annually (through 2045).
3. Proposed resource portfolio satisfies all CA RPS mandates & CA/Riverside GHG targets; carbon-free portfolio achieved by 2040.
4. Springs units should be replaced with BES as soon as generation units reach end-of-life.
5. RERC units should also be replaced with BES when generation units reach end-of-life. However, all early (2035) replacement options result in higher power supply costs.
6. Future portfolio costs will be sensitive to new resource price points, regardless of the underlying technology.

DISTRIBUTION SYSTEM STUDIES: DER IMPACTS

Staff completed a systemwide sensitivity study of DER impacts to the distribution grid by:

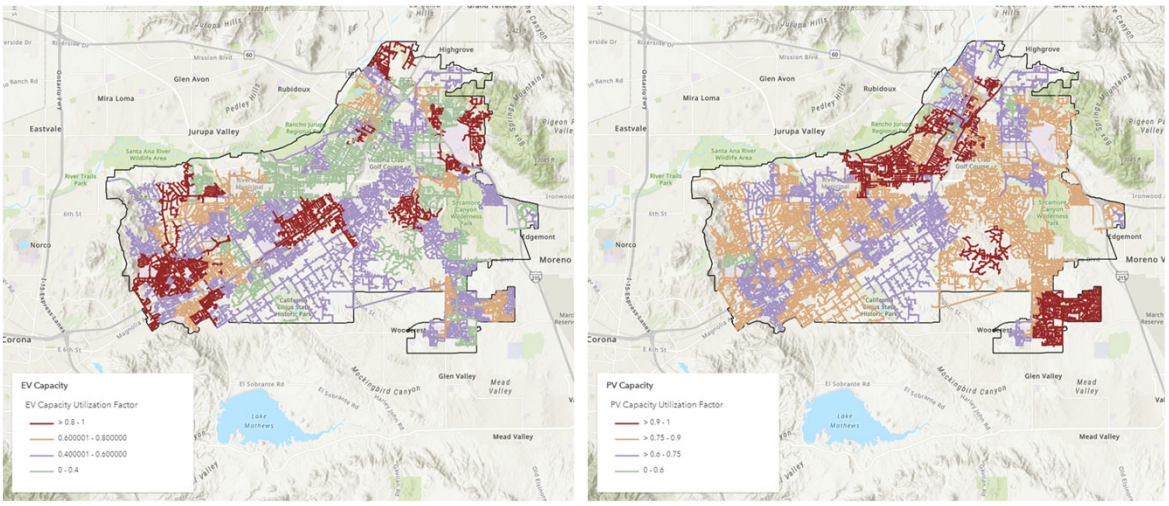
1. Establishing average hourly seasonal and diurnal loading profiles for all distribution circuits, along with their 80% confidence interval (P10-P90).
2. Comparing results from (1) and existing distribution infrastructure capacities against impacts of simulated additions of EV load, fuel switching (building electrification), and PV Generation.
3. Summarizing results from (2) using various sensitivity metrics.

DER IMPACTS: SUMMARY RESULTS

PV, EV, FS Metric of Interest	kW AC	Sum.MW (100%)	Additional Units at 100% Saturation	Sum.MW (50%)	Additional Units at 50% Saturation
Small Res PV System	5.00	142.51	28,502	71.26	14,251
Large Res PV System	8.00	142.51	17,814	71.26	8,907
Comm PV System	100.00	142.51	1,425	71.26	713
Level 1 EV Charger	1.90	374.31	197,005	187.16	98,503
Level 2 EV Charger	11.50	374.31	32,549	187.16	16,274
Heat Pump	9.60	345.37	35,976	172.69	17,988
Oven	3.30	345.37	104,658	172.69	52,329
Dryer	6.10	345.37	56,618	172.69	28,309
Water Heater	4.50	345.37	76,749	172.69	38,374
Whole House	23.50	345.37	14,697	172.69	7,348

1. **Staff simulated additional PV, EV, FS units required to reach existing distribution system capacity limits.**
2. **Results suggest RPU can likely accommodate substantial additions of these resources on *most* of its distribution grid. However, some circuits are already near their limits.**

DER IMPACTS: SPATIAL RESULTS



KEY FINDINGS, CHAPTERS 14-17

1. **Ch. 14: Evaluating the Impact of Increasing Energy Efficiency Program Targets**

   At current pricing levels, investing in additional renewable resources will be typically more cost effective than investing to expand Energy Efficiency programs, except possibly for certain targeted HVAC EE programs.

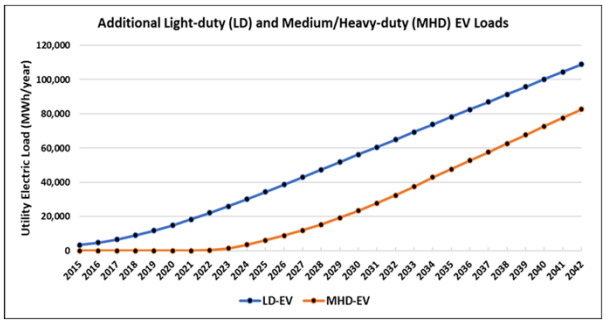
2. **Ch. 15: Retail Rate Design**

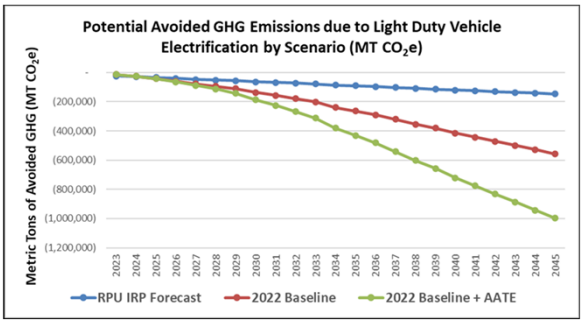
   Our recently approved electric rates help RPU to continue to meet decarbonization goals, while providing financial and revenue stability.

3. **Ch. 16: Transportation Electrification**

   TE has the potential to add significant load and result in additional carbon reduction credits, if local area adoption rates increase.

KEY FINDINGS: TRANSPORTATION ELECTRIFICATION





1. **By 2030, EV energy demand in Riverside is forecasted to be ~56,200 MWh for Light Duty and ~23,300 MWh for Medium/Heavy Duty EVs.**
2. **Overall increase to RPU's annual load is about 2%. These represent baseline assumptions in our IRP load forecasts.**
3. **Annual emissions reductions in 2030 are almost 64,000 MT CO_2e under our baseline assumption.**
4. **Emission reductions would become much more significant under alternative (higher penetration) scenarios.**

KEY FINDINGS, CHAPTERS 14-17 CONT.

4. Ch. 17: Minimizing Local Air Pollutants and Green House Gas Emissions in Disadvantaged Communities

RPU continues to make significant progress minimizing pollutants and emissions; for example, the utility has invested significant efforts at RERC to minimize local air pollutants (35% below industry best practices).

RPU is also offering expanded services and assistance programs to our lower income customers, as part of our new rate plan.

POTENTIAL FUTURE STUDIES

1. **The role of future generation technologies in RPU's resource planning efforts** (e.g., the need to study and identify viable resources to satisfy the baseload carbon-free energy needs in 2034 and beyond, as described in Chapters 11 and 12).
2. **Improved methodologies for performing more comprehensive distribution system ICA studies** (e.g., the need to build on analyses described in Chapter 13 to enhance our distribution planning efforts).
3. **Potential future DR and/or EE/DSM efforts** (e.g., the need to study and identify savings potential with novel EE, DSM, and DER programs – especially programs that can reduce our peak summer loads).
4. **The value and benefits of a more comprehensive and integrated future TE planning effort** (e.g., the need to develop a comprehensive EV Transportation enhancement plan).

COMMUNITY MEETINGS

1. **Two community meetings held seeking input for future analysis:**
   a. Saturday, April 13: Main Library
   b. Thursday, April 18: Casa Blanca Library
2. **Draft 2023 Integrated Resources Plan posted on the RPU website for public review.**
3. **Staff are taking input from the community on desired/preferred future studies.**

STRATEGIC PLAN ALIGNMENT

Strategic Priority 4 – Environmental Stewardship

Goal 4.1 - Rapidly decrease Riverside's carbon footprint by acting urgently to reach a zero-carbon electric grid with the goal of reaching 100% zero-carbon electricity production by 2040 while continuing to ensure safe, reliable, and affordable energy for all residents.

Goal 4.6 - Implement the requisite measures to achieve citywide carbon neutrality no later than 2040.

Cross-Cutting Threads

- Community Trust
- Fiscal Responsibility
- Sustainability & Resiliency
- Equity
- Innovation

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RECOMMENDATIONS

That the Mobility & Infrastructure Committee recommend that the City Council:

1. Approve and adopt the 2023 Integrated Resource Plan for Riverside Public Utilities; and
2. Direct staff to file the adopted 2023 Integrated Resource Plan and any applicable supporting material with the California Energy Commission within five (5) business days after adoption of the 2023 IRP.

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